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SPECIFICATIONS FOR AIRPLANE WEATHER OBSERVATIONS

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For making one airplane weather observation daily, Sundays and holidays included, for the Weather Bureau during the fiscal year July 1, 1935, to June 30, 1936, inclusive, in accordance with the following schedule and conditions:

For a daily flight started at 4:00 a.m. (75th Meridian Time) to 17,000 feet above sea-level. (By "starting" a flight is meant the actual take-off of the airplane. By "ground" is meant the point over the airport corresponding to the elevation of the floor of the instrument shelter in which the aerometeorograph is placed before being mounted on the airplane.

- A. Cost per flight based on using 1-way radio (receiving in airplane only). See V EQUIPMENT AND PERSONNEL (b) (3), of these specifications\$ _____
- B. (Alternate) Cost per flight based on using 2-way radio (bidder should indicate whether code or voice). See VIII GENERAL (h) of these specifications\$ _____

I. SCHEDULE OF FLIGHTS-

- (a) Although flights must be started as a rule at the time specified above, latitude in starting them earlier or later will be allowed under conditions set forth hereinafter.
- (b) No flight shall be started earlier than 3:30 a.m. (75th Meridian Time).
- (c) No flight shall be started later than 4:30 a.m. (75th Meridian Time) unless one or both of the conditions specified under VI PAYMENT (c) (8) of these specifications obtain. However, no flight shall be started after 5:00 p.m. (75th Meridian Time) on any day.
- (d) Whenever a flight is delayed due to any of the conditions specified under VI PAYMENT (c) (8) of these specifications, it shall be started as soon as possible after the conditions of exemption specified under VI PAYMENT (c) (8) no longer obtain.

II. WEATHER CONDITIONS-

- (a) Weather conditions will be considered unfavorable for the making of flights when the ceiling at the airport from which the flights are regularly made is reported by the Weather Bureau as being lower than 800 feet or the visibility as less than 2 miles.

- (b) The Weather Bureau representative will furnish a flight forecast for any flight upon request from the pilot.

III. DEFINITION OF FLIGHT-

- (a) A flight will consist of making an airplane ascent (the airplane to be instrumentally equipped as hereinafter set forth), at a rate of ascent not greater than 1,500 feet per any five minute period. (Time intervals during which airplane is leveling off, as indicated in the following paragraph (b), will be deducted in computing above rate of ascent.)
- (b) The airplane must level off during the ascent for at least one minute at 1,500 feet above ground and at each successive 3,000-foot interval up to and including the maximum elevation reached.
- (c) After reaching the maximum elevation the airplane will return to the ground as rapidly as practicable, proper caution being taken so that the rapid air speed will not cause the aerometeorograph to break loose from its mounting.
- (d) The place of landing must be at the place of take-off unless weather conditions as indicated under II WEATHER CONDITIONS (a) of these specifications, make this impracticable.
- (e) The entire flight must be made, as nearly as practicable, directly over the airport from which the take-off is regularly made.
- (f) No ascent reaching a maximum height equal to less than 20% of the difference in elevation between the ground and 17,000 feet above sea-level, shall be deemed to constitute a flight within the meaning of these specifications.
- (g) The maximum height of each flight will be computed and determined from the aerometeorograph record by standard Weather Bureau methods. In the event of failure of the aerometeorograph to record, payment will be made on the basis of the altimeter readings as provided for under IV (d) of these specifications. Such altimeter readings will be corrected, if necessary, by

the Weather Bureau, in accordance with the previous general agreement found between the altimeter indications and the height as computed by standard Weather Bureau methods.

IV. WRITTEN REPORT OF FLIGHT-

The pilot shall submit as promptly as possible and in no case longer than 30 minutes after each landing, to the local Weather Bureau representative a written and signed statement containing the following information. All elevations furnished by the pilot will be obtained from the altimeter and it must always be shown whether they are above sea level or above ground.

- (a) Time and altimeter reading when,
 - (1) Entering and emerging from clouds, fog, smoke, haze and turbulent layers;
 - (2) Encountering and emerging from precipitation;
 - (3) Beginning and ending of ice formation on the airplane;
 - (4) Encountering and emerging from any other unusual condition;
 - (5) In every case it should be indicated whether the airplane entered or emerged from the base, top or side, etc., of the condition referred to.
- (b) When the airplane does not emerge at the maximum altitude from one or more of the conditions referred to in (a) above, that fact must be stated.
- (c) Whenever any of the conditions referred to in (a) above, prevail, but are not actually entered by the airplane, and it is practicable to estimate their elevation with reasonable accuracy, this will be done and such elevations will be marked "estimated".
- (d) Time of reaching, and altimeter reading at, maximum altitude.
- (e) Types of clouds and number of tenths of each, visible to pilot during the flight and time of each such cloud observation.

- (f) Time of occurrence of lightning and thunder, or both, and the direction from station observed or heard.
- (g) Whenever the flight is started between sunrise and sunset, the pilot will record vertical visibility according to the following scale:

<u>Scale</u>	<u>Criteria</u>
0	Nothing on ground visible at all.
1.	Only larger objects on ground recognized, color distinctions hardly apparent.
2.	Details of objects on ground not visible, though outlines still apparent. Definite bluish (or brownish) haze veiling everything, through which only reds and yellows really stand out.
3.	Haze quite apparent, details of objects not easy to distinguish, though not so with the outlines; colors except reds and yellows tend to the same tone.
4.	Details of ground objects easily distinguishable, colors dimmed a little, haze perceptible when looked for but not otherwise.
5.	Ground objects sharp and clear; no sign of haze. (Photographs can be taken on the usual fast films without filters).

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The above vertical visibility observations will be made by noting the appearance of objects on the ground directly below the airplane.

Oblique visibility observations will be made by noting the greatest distances in miles at which objects on the ground are visible. The oblique visibility will be the average for all directions.

The above visibility observations will be made at 5,000 and 10,000 feet above sea level and at the maximum elevation reached. The elevation at which each visibility observation is made should always be indicated. Whenever a cloud layer is encountered the visibility observations will be made just before entering the cloud layer and appropriate explanatory notes made in such cases.

- (h) Times will be given to the nearest minute and elevations should be indicated to have been obtained from the altimeter; also, whether they are above sea level or above ground.
- (i) The pilot will cause the electric time-recording pen to mark the meteorogram at the moment of take-off and beginning of descent and whenever conditions in (a) above, occur.

V. EQUIPMENT AND PERSONNEL-

- (a) To be furnished by the Weather Bureau.
 - (1) The Weather Bureau will furnish an aerometeorograph (weight approximately 7 lbs.) for recording temperature, pressure and humidity.
 - (2) A representative of the Weather Bureau will mount this instrument on the airplane before each flight is begun and remove it from the airplane when the flight is terminated.
- (b) To be furnished by the contractor.
 - (1) The contractor must furnish properly licensed pilot; airplane, having service ceiling of 17,000 feet, i. e., capable of climbing 100 feet per minute at an elevation of 17,000 feet above sea level, with load including aerometeorograph, pilot and sufficient fuel for an additional hour's flight after reaching 17,000 feet above sea level; the airplane must be equipped with the following instruments, properly calibrated and installed:
 - (i) One approved Bank and Turn Indicator.
 - (ii) Artificial horizon.
 - (iii) Directional gyro.
 - (iv) One compass, properly damped and compensated.
 - (v) Air speed indicator with electrically heated pitot tube.

- (vi) Approved rate of climb indicator.
- (vii) One sensitive type altimeter, adjustable for barometric pressure.
- (viii) Complete set of engine instruments as required by Bulletin 7 and Bulletin 7-A, and in addition, manifold pressure gauges where super-charged engines are used.
- (ix) One flash light for observing ice formation on plane, precipitation, clouds, etc.
- (x) Flares for emergency landing.
- (xi) One parachute of type approved by the Bureau of Air Commerce;

a suitable mounting apparatus for carrying the above mentioned aerometeorograph on the airplane, including wiring, battery and connectors for operating the electric time-recording pen. This pen is operated by means of magnet coils wound to be used with a 12-volt storage battery with an open circuit. However, a 6-volt storage battery or two ordinary dry cells can be used, if preferred. No. 18 to 24 rubber covered wire or flexible cord is recommended for the connections.

- (2) The aerometeorograph must be mounted as follows:
 - (i) On a biplane, between the wings as far from the fuselage as possible (not less than 6 feet), from $1/2$ to $2/3$ of the distance from the lower to the upper wing and from $1/2$ to $2/3$ of the distance from the leading edge of the upper wing to the rear edge of the upper wing.
 - (ii) On a monoplane, as far from the fuselage as possible (not less than 6 feet) from $1/2$ to $2/3$ of the distance from the leading edge to the rear edge of the wing and as far below the wing as possible, but in no case will the distance below the wing be less than 18 inches.

- (iii) The position and method of mounting the aerometeorograph must be approved by the Weather Bureau representative.
- (3) At places where Government radio-broadcast or radio range stations are in operation the contractor must furnish and equip the airplane making these flights with a suitable radio receiving apparatus, the chief purpose of which is to provide a means of informing the pilot of changes in weather conditions and to enable him to keep the airplane over the airport when the ground is not visible from aloft.

VI. PAYMENT-

- (a) Payment will be made as soon after the end of each month as it is possible to audit the vouchers at the U. S. Department of Agriculture, Washington, D. C.
- (b) No additional payment will be made for flights reaching higher than 17,000 feet above sea-level but for flights reaching less than 17,000 feet above sea-level, payment will be made in accordance with the following percentage scale:

A percentage will be found by dividing the maximum height reached above ground by the difference in height between the ground and 17,000 feet above sea-level:

when this percentage is less than 100, but equal to 90 or more, a payment of 90% of the bid price of a flight to 17,000 feet above sea level will be made;

when this percentage is less than 90 but equal to 80 or more, a payment of 80% of the bid price of a flight to 17,000 feet above sea level will be made;

when this percentage is less than 80 but equal to 70 or more, a payment of 70% of the bid price of a flight to 17,000 feet above sea level will be made;

when this percentage is less than 70 but equal to 60 or more, a payment of 60% of the bid price of a flight to 17,000 feet above sea level will be made;

when this percentage is less than 60 but equal to 50 or more, a payment of 50% of the bid price of a flight to 17,000 feet above sea level will be made;

when this percentage is less than 50 but equal to 40 or more, a payment of 40% of the bid price of a flight to 17,000 feet above sea level will be made;

when this percentage is less than 40 but equal to 30 or more, a payment of 30% of the bid price of a flight to 17,000 feet above sea level will be made;

when this percentage is less than 30 but equal to 20 or more, a payment of 20% of the bid price of a flight to 17,000 feet above sea level will be made;

when this percentage is less than 20, no payment will be made for the flight.

- (c) While the contractor shall have the right of decision as to whether or not any flight shall be made;
- (1) there will be deducted from amounts otherwise due him liquidated damages at the rate of 100% of the contract price of one daily flight to 17,000 feet above sea level, in accordance with these specifications, for each day's failure to make such flight, except when the failure is due to either or both of the conditions specified under VI PAYMENT (c) (8) of these specifications;
 - (2) there will be deducted from amounts otherwise due him liquidated damages at the rate of 25% of the contract price of one daily flight to 17,000 feet above sea level, in accordance with these specifications, when the flight is started after 4:30 a.m. but not later than 6:00 a.m. (75th Meridian Time), except when this is due to any of the conditions specified under VI PAYMENT (c) (8) of these specifications;
 - (3) there will be deducted from amounts otherwise due him liquidated damages at the rate of 50% of the contract price of one daily flight to 17,000 feet above sea level, in accordance with these specifications, when

the flight is started after 6:00 a. m. (75th Meridian Time), except when this is due to any of the conditions specified under VI PAYMENT (c) (8) of these specifications;

- (4) there will be deducted from amounts otherwise due him liquidated damages at the rate of 25% of the contract price of one daily flight to 17,000 feet above sea level in accordance with these specifications, whenever a delay of more than 90 minutes, but not more than 3 hours, occurs before the flight is started after the conditions of exemption specified under VI PAYMENT (c) (8) of these specifications no longer obtain;
- (5) there will be deducted from amounts otherwise due him liquidated damages at the rate of 50% of the contract price of one daily flight to 17,000 feet above sea level, in accordance with these specifications, whenever a delay of more than 3 hours occurs before the flight is started after the conditions of exemption specified under VI PAYMENT (c) (8) of these specifications no longer obtain.
- (6) If, on any day, a flight reaching a maximum height equal to 20% or more, of the difference in elevation between the ground and 17,000 feet above sea level, but reaching less than 17,000 feet above sea level, is made at the scheduled time, i. e., between 3:30 a. m. and 4:30 a. m. (75th Meridian time), the contractor shall be permitted to make another flight on the same day, and in such cases he will be paid according to the maximum elevation reached in the later flight, provided this was higher than that reached in the first flight, and no deduction will then be made for the lateness of the flight.
- (7) Payment will not be made for more than one flight on any one day, nor for any flight started before 3:30 a. m. or after 5:00 p. m. (75th Meridian time) on any day.

- (8) No deductions in payment will be made from amounts otherwise due the contractor for flights not started on scheduled time, or for flights not made, when the cause is due to:
 - (i) Unfavorable weather conditions as specified under II WEATHER CONDITIONS (a) of these specifications; or to:
 - (ii) the Weather Bureau representative not being prepared to mount the aerometeorograph on the airplane.

VII CONTRACT-

Each bidder must furnish a guarantee bond or certified check drawn in favor of the Disbursing Clerk, U. S. Department of Agriculture, as security in the amount of \$300.00 guaranteeing that he will not withdraw his bid within 30 days after the opening of same and that he will, if awarded the contract, execute formal contract and bond, such bond to be in amount of \$3000.00

VIII GENERAL-

- (a) The pilots making these flights must hold a Transport Pilot's License and pass the Scheduled Air Transport Rating tests if awarded the contract. It will not be necessary, however, that they hold an S. A. T. Rating in case they do not have to their credit the necessary number of flying hours for this rating. Arrangements will be made by the Weather Bureau for the Inspectors of the Bureau of Air Commerce to give the necessary S. A. T. R. tests to those awarded contracts. In case a pilot is awarded the contract and fails to pass the S. A. T. R. tests, referred to above, he will be required to procure the services of a pilot for making these flights, who passes these tests satisfactorily.
- (b) The airplanes used in these flights must have been duly inspected and approved by the Bureau of Air Commerce.
- (c) In view of the frequent hazardous conditions under which these flights are made, the carrying of passengers, except a properly licensed

pilot or Weather Bureau official, on these flights is prohibited. The contractor will not be required to carry a Weather Bureau representative on these flights.

- (d) The contractor shall, without additional expense to the Weather Bureau, obtain all required licenses and permits and the Government shall not be responsible for any damages to persons and property that occur as a result of his fault or negligence in connection with the prosecution of the work.
- (e) The contractor will be required to taxi the airplane to within 300 feet of the Weather Bureau Airport Station before and after the flight for the purpose of having the instrument mounted and removed from the airplane, except when, owing to forced landing elsewhere, or to conditions on the airport, this requirement is waived on any particular flight by authority of the Weather Bureau representative. (See V EQUIPMENT AND PERSONNEL (a) (2) of these specifications).
- (f) The flights shall be made at the
.....Airport.
City.....State.....
Elevation of ground above sea level.....feet.
- (g) If the contractor fails to attain a height of 17,000 feet above sea level on more than three days during any 30 consecutive days, except when in the judgment of the Weather Bureau Officials conditions make this excusable, or for any other reason fails to perform satisfactorily the airplane service required herein, the Weather Bureau may procure such service in the open market and the contractor and his sureties will be held liable to the Government for any excess cost over the contract rate occasioned the Government thereby.
- (h) A separate bid shall be submitted whereby the contractor will be required to furnish and equip the airplane making these flights with a suitable 2-way radio apparatus for receiving and transmitting by code or voice. (See Alternate B, page 1 of these specifications).
- (i) The Weather Bureau reserves the right to reject any or all bids; also to accept either of the alternate bids as regards the use of 1-way or 2-way radio equipment.

